

CLAIMS

1. A receiver unit in a wireless communication system, comprising:
 - a demodulator operative to process received data symbols to provide recovered symbols;
 - a first data processor operative to process the recovered symbols to provide decoded data;
 - a second data processor operative to process the decoded data to provide remodulated symbols; and
 - a detector operative to process the received data symbols and the remodulated symbols to provide a detector output.
2. The receiver unit of claim 1, wherein the received data symbols are for a data transmission hypothesized to have been received, and wherein the detector output indicates whether or not the data transmission is deemed to have been received.
3. The receiver unit of claim 2, further comprising:
 - a threshold computation unit operative to determine a threshold to use for the data transmission, and
 - wherein the detector is operative to provide a metric based on the received data symbols and the remodulated symbols, and wherein the detector output is determined based on the metric and the threshold.
4. The receiver unit of claim 3, wherein the threshold computation unit is operative to determine the threshold based on a plurality of received signals for a plurality of antennas, and wherein the detector is operative to determine the metric based on the plurality of received signals.
5. The receiver unit of claim 1, wherein the detector is further operative to process received pilot symbols to provide the detector output.

6. The receiver unit of claim 5, wherein data symbols are transmitted on data subbands and pilot symbols are transmitted on pilot subbands, and wherein the data subbands are multiplexed with the pilot subbands.

7. The receiver unit of claim 6, wherein the data subbands are interlaced with the pilot subbands such that each of the data subbands is flanked on both sides by pilot subbands.

8. The receiver unit of claim 1, wherein the detector is operative to perform coherent detection in time domain.

9. The receiver unit of claim 8, wherein the received data symbols are obtained based on input samples for a data transmission hypothesized to have been received, and wherein the detector is operative to perform correlation between the input samples and reconstructed samples obtained based on the remodulated symbols.

10. The receiver unit of claim 8, wherein the received data symbols are obtained based on input samples for a data transmission hypothesized to have been received, and wherein the detector is operative to perform correlation between the input samples and reconstructed samples obtained based on the remodulated symbols and pilot symbols for the data transmission.

11. The receiver unit of claim 1, wherein the detector is operative to perform differential detection in the frequency domain.

12. The receiver unit of claim 5, wherein the detector is operative to
multiply each of the received data symbols with a corresponding one of the remodulated symbols to provide a demodulated data symbol,
multiply each of the received pilot symbols with a corresponding one of known pilot symbols to provide a demodulated pilot symbol,
perform dot products between demodulated data symbols and demodulated pilot symbols, and
accumulate results of the dot products.

13. The receiver unit of claim 2, wherein the data transmission is for a random access channel in the wireless communication system.

14. The receiver unit of claim 1, wherein the wireless communication system uses multi-carrier modulation.

15. The receiver unit of claim 1, wherein the wireless communication system uses orthogonal frequency division multiplexing (OFDM).

16. A receiver unit in a wireless communication system, comprising:
a processor operative to process received data symbols for a data transmission hypothesized to have been received and provide remodulated symbols that are estimates of transmitted data symbols; and
a detector operative to process the received data symbols and the remodulated symbols to provide a detector output that indicates whether or not the data transmission is deemed to have been received.

17. The receiver unit of claim 16, wherein the processor is operative to demodulate the received data symbols to provide recovered symbols, decode the recovered symbols to provide decoded data, and re-encode the decoded data to provide the remodulated symbols.

18. The receiver unit of claim 16, wherein the processor is further operative to process received pilot symbols for the data transmission and corresponding known pilot symbols to provide the detector output.

19. A receiver unit in a wireless communication system, comprising:
a signal detector operative to determine a metric for a data transmission hypothesized to have been received;
a threshold computation unit operative to determine a threshold for the hypothesized data transmission; and

a comparator operative to receive the metric and the threshold and provide an output indicating whether or not the data transmission is deemed to have been received.

20. The receiver unit of claim 19, wherein the threshold is determined based on received pilot symbols for the hypothesized data transmission.

21. The receiver unit of claim 20, wherein the threshold is further determined based on received data symbols for the hypothesized data transmission.

22. The receiver unit of claim 19, wherein the metric relates to signal energy of the hypothesized data transmission.

23. The receiver unit of claim 19, wherein the signal detector is operative to determine the metric based on a plurality of received signals for a plurality of antennas, and wherein the threshold computation unit is operative to determine the threshold based on the plurality of received signals.

24. A method of detecting data transmissions in a wireless multiple-access communication system, comprising:

first processing received data symbols for a data transmission hypothesized to have been received to provide remodulated symbols that are estimates of transmitted data symbols; and

second processing the received data symbols and the remodulated symbols to provide a detector output that indicates whether or not the data transmission is deemed to have been received.

25. The method of claim 24, wherein the first processing includes demodulating the received data symbols to provide recovered symbols, decoding the recovered symbols to provide decoded data, and re-encoding the decoded data to provide the remodulated symbols.

26. The method of claim 24, further comprising:

determining a threshold to use for the hypothesized data transmission, and wherein the detector output is further determined based on the threshold.

27. The method of claim 26, wherein the second processing includes determining a metric based on the received data symbols and the remodulated symbols, and comparing the metric against the threshold, and wherein the detector output is based on the comparing.

28. A method of detecting data transmissions in a wireless multiple-access communication system, comprising:

determining a metric for a data transmission hypothesized to have been received; determining a threshold for the hypothesized data transmission based on samples received for the hypothesized data transmission; and

comparing the metric against the threshold to provide an output indicating whether or not the data transmission is deemed to have been received.

29. An apparatus in a wireless multiple-access communication system, comprising:

means for processing received data symbols for a data transmission hypothesized to have been received to provide remodulated symbols that are estimates of transmitted data symbols; and

means for processing the received data symbols and the remodulated symbols to provide a detector output that indicates whether or not the data transmission is deemed to have been received.

30. The apparatus of claim 29, further comprising:

means for demodulating the received data symbols to provide recovered symbols;

means for decoding the recovered symbols to provide decoded data; and

means for re-encoding the decoded data to provide the remodulated symbols.

31. An apparatus in a wireless multiple-access communication system, comprising:

means for determining a metric for a data transmission hypothesized to have been received;

means for determining a threshold for the hypothesized data transmission based on samples received for the hypothesized data transmission; and

means for comparing the metric against the threshold to provide an output indicating whether or not the data transmission is deemed to have been received.